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10/820,024

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Masaaki Oyamada

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EXAMINER

TSOY, ELENA

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/820,024

Applicant(s)

OYAMADA ET AL.

Examiner

Elena Tsoy Lightfoot

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3,5,7 and 9-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3,5,7 and 9-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB06)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Amendment

Amendment filed on July 9, 2008 has been entered. New claims 40-41 have been added. Claims 3, 5, 7, and 9-41 are pending in the application.

Examiner Note

1. A phrase "initial *thin* nickel film" was interpreted by the Examiner according to the specification as originally filed as a film having thickness within a range of 0.001-2 microns (See published Application, P31).

Declaration under 37 CFR 1.132

2. The Declaration under 37 CFR 1.132 filed October 26, 2007 is insufficient to overcome the rejection of claims 3, 5, 7, and 9-34 based upon primary reference of JP 1-242782 because Applicants' experiments were carried out not in accordance to the ground of rejection presented by the Examiner. Note that the Examiner has considered claimed step III to be obvious over the JP 1-242782 reference. However, the Declaration omitted entirely obvious claimed step III.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 5, and 7-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al (JP 1-242782).

Kawakami et al discloses a method for making conductive (See Translation, page 22, paragraph 1) electroless plated powder comprising the steps of: (i) allowing the core particles which have a noble metal ion-capturing ability to capture noble metal ions (See Translation, page 14) such as Pd using dilute acid solution of palladium salt (See Translation, page 14, paragraph 2), and reducing the noble metal ions by a reducing agent used in the electroless plating solution *optionally* in the presence of a complexing agent used in the electroless plating solution (See

Translation, page 15, paragraph 1) so that the surfaces of the core particles support the noble metal (claimed step I) (See Translation, page 15, lines 2-7); (ii) dispersing the core particles in a dispersion medium such as an aqueous solution containing complexing agent (See Translation, page 17, paragraph 2), e.g. *wastewater of plating* containing a complexing agent (See Translation, page 17, five bottom lines); and adding *at least two* solutions constituting electroless plating solution (claimed initial thin film forming solution), e.g. a nickel ion-containing solution, a complexing agent solution such as *tartaric acid*, glycine or ethylenediamine solution (See Translation, page 18, lines 6-7; page 25, Table 5), and a solution of reducing agent such as *sodium borohydride* or *dimethylamine borane* (See Translation, page 19, paragraph 3), individually and simultaneously to the aqueous suspension containing the dispersion of core particles to perform electroless plating (claimed step II) (See Translation, page 19). Kawakami et al also teaches that after adding the plating solution, the plating reaction starts promptly (See Translation, page 21, paragraph 2, lines 1-2). It is the Examiner's position that that the step (ii) of Kawakami et al reads on claimed step II of dispersing the core particles in an initial thin film forming solution because claimed step II does not recite the order of adding the core particles and initial thin film forming solution.

Kawakami et al fails to teach that one more plated nickel layer is applied over the plated nickel layer by adding individually and simultaneously a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, to the aqueous suspension containing nickel plated core particles and the complexing agent (claimed step III) (Claim 3, 16, 40).

However, claimed step III would be obvious over Kawakami et al for the following reasons:

(a) Obviously, in order to make the above mentioned *two* solutions constituting electroless plating solution from *three* components (i.e. a nickel ion-containing solution, a complexing agent solution, and a reducing agent solution), two components out of three should be combined together. Clearly, the nickel ion-containing solution cannot be combined to prevent premature reaction. In other words, the nickel ion-containing solution and the reducing agent solution should be added to the aqueous suspension of core particles as two *separate* solutions. Thus, the complexing agent should be combined either with the nickel ion-containing solution or

with the reducing agent solution. Therefore, it would be obvious to one of ordinary skill in the art to combine the complexing agent with the nickel ion-containing solution.

(b) It is a well-known principle to reapply a coating composition to achieve a desired thickness of a final coating depending on intended use of the final coated product. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have reapplied a plated nickel layer in Kawakami et al, according to well-known principle, by adding the first and second solutions constituting electroless plating solution to an aqueous dwith the expectation of providing the desired thickness of a final coating. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed a second nickel film layer over the applied nickel film layer in Kawakami et al by adding to the aqueous suspension of the nickel plated core particles a first solution, which contains a nickel ion-containing solution and the complexing agent, and a second solution, which contains a reducing agent, individually and simultaneously with the expectation of providing the desired nickel plated particles.

Thus, if the initial plated nickel layer is too *thin*, i.e. is not of desired thickness, the plating process can be repeated in the presence of **wastewater of the initial nickel plating** solution.

It is the Examiner's position that the plated nickel film includes columnar structures extending in a direction of thickness of a nickel film since it is formed by a process substantially identical to that of claimed invention.

As to claim 10, the core particles are imparted with the noble metal ion-capturing ability by a surface treatment (See Translation, page 14).

As to claims 33-34, different kinds of metals such as **nickel and gold** (See Translation, page 19, paragraph 2) may be deposited in several layers on the metal-coated powder (See Translation, page 21, paragraphs 2-4), e.g. gold layer on top of nickel layer (See Translation, page 31).

As to claimed concentration and thickness limitations, the mixing ratio of the metal salt and the *reducing* agent varies depending on the combination thereof. For example, the mixing ratio of the nickel salt and alkali borohydride may vary from 1:1.5 to 2.5 (See Translation, page 19, last paragraph and Table 3). Kawakami et al teaches that the

concentration of each reducing agent can be set within saturation concentration and is not particularly limited (See Translation, page 20). Kawakami et al further teaches that the rate of addition of the reducing agent solution directly affects the plating reaction and is significantly related to the surface area and physical properties of the core material. Thus, it is necessary to add the agent solution by controlling so that irregularities do not occur in the plating film and uniform and strong film can be formed. See Translation, page 20. If the individual agents are added at the proper ratio, all of the metal salt added is reduced and deposited on the surface of the core material. Consequently, the thickness of the plating film can be controlled arbitrarily depending on the amount of addition. See Translation, page 21, paragraph 2. Moreover, it is well settled that differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant concentration parameters (including those of claimed invention) in Kawakami et al through routine experimentation in the absence of showing of criticality.

5. Claims 3, 5, and 7-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al in view of Weber et al (US 6,274,241).

Kawakami et al are applied here for the same reasons as above. Kawakami et al teaches that core material include inorganic core materials such as metals, glass, ceramic, metal oxides, organic core materials (See Translation, page 12, paragraph 2), that can be used alone or *in combination of two or more* (See Translation, page 12, paragraph 2, last two lines). Kawakami et al fails to teach that a combination of glass and metal core materials can be prepared by electroless plating of glass powder by forming first a nucleation layer of Pd metal on the surface of the glass powder, and then exposing a nucleated glass powder to electroless plating solution containing a nickel salt, a reducing agent, and complexing agent so that a second plated layer is applied over said first plated layer in the presence of wastewater of a first plating solution.

Weber et al teaches that *nickel* film (See column 5, lines 45-47) can be applied to glass powder (See column 3, lines 48-58) by forming first a nucleation layer of Pd metal on the surface of the glass powder (See Example 1), and then exposing a nucleated glass powder to electroless plating solution containing a nickel salt, a reducing agent, and complexing agent (See Example 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used nickel coated non-metal core materials as metal core particles in Kawakami et al since Kawakami et al teach that combination of two core materials can be used as core materials, and Kawakami et al do not limit core materials to particular metals. It would have also been obvious to one of ordinary skill in the art at the time the invention was made to have coated nucleated non-metal core materials such as glass particles with nickel film in Kawakami et al using electroless plating since Weber et al teach that *nickel* film can be applied to glass powder by forming first a nucleation layer of Pd metal on the surface of the glass powder, and then exposing a nucleated glass powder to electroless plating solution containing a nickel salt, a reducing agent, and complexing agent.

6. Claims 3, 5, and 7-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami et al or Kawakami et al in view of Weber et al, as applied above, further in view of Segawa et al (JP 2001-316834).

The cited prior art is applied here for the same reasons as above. Kawakami et al does not expressly teach that at least *two* solutions constituting electroless plating solution to be added individually and simultaneously to the suspension of core particles are made by combining a complexing agent solution with a nickel salt solution.

Segawa et al teach that if a reducing agent is mixed in advance with a chelating solution of cobalt, a reduction reaction will proceed due to the reducing agent, the life of the plating solution will become shorter, and a change will arise in the film-forming rate along with time between the start and end of the life of the plating solution (See P53). Further nickel and cobalt easily precipitate as hydroxides in an alkaline solution (See P61). Therefore, in order to prevent reduction of life of a plating solution and obtain homogeneous good plating deposits (See P31), it is desirable to hold each component of a plating solution separately in two or more

tanks and mix them with a plating cup 21 (See P51), for example, a metal solution containing chelating agent separately from a reducing agent containing pH regulator (See P15, 23, 51-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a combination of a metal salt solution with a chelating agent as one solution and a solution of a reducing agent and pH-regulator as second solution in the cited prior art with the expectation of preventing reduction of life of a plating solution and obtaining the desired homogeneous good plating deposits, as taught by Segawa et al.

Declaration under 37 CFR 1.132

The Declaration under 37 CFR 1.132 under 37 CFR 1.132 filed July 9, 2008 is insufficient to overcome the rejection of claims 3, 5, 7, and 9-41 based upon Kawakami et al as set forth in the current Office action because: Experiment 2 of the Declaration under 37 CFR 1.132 filed on October 26, 2007 clearly proves that an initial thin film is not formed on the surface of the core powder by using the method described in Kawakami et al. because the reducing agent contained in the aged plating solution does not have a high reducing power sufficient to reduce metal ions.

This is not persuasive because:

(i) the Examiner does not understand why Applicants used a *reducing* agent contained in the aged plating solution when Kawakami et al expressly teaches that nickel film is formed by adding at least two solutions constituting electroless plating solution, e.g. a nickel ion-containing solution, a complexing agent solution such as tartaric acid, glycine or ethylenediamine solution (See Translation, page 18, lines 6-7; page 25, Table 5), and a solution of reducing agent such as sodium borohydride or dimethylamine borane (See Translation, page 19, paragraph 3), individually and simultaneously to the aqueous suspension containing the dispersion of core particles to perform electroless plating (See Translation, page 19). Note that Kawakami et al does not teach the use of a *reducing* agent contained in the aged plating solution. Instead, Kawakami et al teaches that core particles may be nickel plated *optionally* in the presence of wastewater of plating solution containing a complexing agent (not reducing agent).

(ii) it is not clear why Applicants did not follow a method of Kawakami et al as described in working examples and obtained a nickel film when Kawakami et al expressly teaches that **nickel film is formed** using a plating solution wherein the mixing ratio of the nickel salt and alkali borohydride should vary from 1:1.5 to 2.5 (See Translation, page 19, last paragraph and Table 3).

Response to Arguments

Applicant's arguments filed July 9, 2008 have been fully considered but they are not persuasive.

Applicants submit that Experiment 2 of the Declaration under 37 CFR 1.132 filed on October 26, 2007 clearly proves that an initial thin film is not formed on the surface of the core powder by using the method described in Kawakami et al. because the reducing agent contained in the aged plating solution does not have a high reducing power sufficient to reduce metal ions. Therefore, Kawakami et al. do not teach, disclose or suggest the claimed steps (II) and (III) of the present invention. Page 22 of 37

The Examiner respectfully disagrees with this argument for the reasons discussed above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy Lightfoot whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Friday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit: 1792

Elena Tsoy-Lightfoot, Ph.D.
Primary Examiner
Art Unit 1792

August 14, 2008

/Elena Tsoy Lightfoot/

Primary Examiner, Art Unit 1792